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<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/459,598	LEVY, SHARON	
	<b>Examiner</b>	<b>Art Unit</b>	
	Mujtaba K Chaudry	2133	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 06/07/2004.
2. ☒ The allowed claim(s) is/are 1,4-9,11,15-19,21-24,26,27,29-31,33 and 43-49.
3. ☒ The drawings filed on 05 May 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)           |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                   |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance  |
|   | 9. <input type="checkbox"/> Other _____   |

  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2100**

### **EXAMINER'S AMENDMENT**

An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to Applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this Examiner's amendment was given in a telephone interview with Mark S. Cohen (212-632-3480).

In claim 44, please replace preamble with:

**The decoder of claim 43...**

### **REASONS FOR ALLOWANCE**

Claims 1, 4-9, 11, 15-19, 21-24, 26-27, 29-31, 33 and 43-49 are allowed. The following is and Examiner's statement of reasons for allowance.

Independent claim 1 of the present application teaches to recursively calculate be backward calculation unit state metrics from a block of symbols in a predetermined direction; storing at a first storage area reference vectors corresponding to a selected group of the calculated state metric vectors; and re-calculating in the predetermined direction starting from a stored reference vector of the stored reference vectors at least some of the state metric vectors and storing at a second storage area the at least some re-calculated state metric vectors. The prior art of record, namely Viterbi et al., teaches a soft decision output decoder and decoding method. The decoder decodes a sequence of signals output by an encoder and transmitted over a channel. The soft decision output decoder includes a first "generalized" Viterbi decoder for decoding the

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sequence of signals received over the channel during a forward iteration through a trellis representing the encoder output having a block length  $T$ . The first "generalized" Viterbi decoder begins at an initial state  $t_{sub.0}$  and provides a plurality of forward iteration state metrics  $\alpha$  for each state at each time interval over a window of length  $2L$ , where  $L$  is on the order of a few constraint lengths and  $2L$  is less than a block length  $T$ . A second "generalized" Viterbi decoder decodes the sequence of signals received over the channel during a backward iteration through the trellis. The second decoder starts at a second time  $t_{2L}$  and provides a plurality of backward iteration state metrics  $\beta$  for each state at each time interval. A processor then performs a dual maxima computation at each state using the forward state metric, the backward state metric and the branch metric for same to provide a measure of the likelihood that a particular sequence of data was transmitted by the encoder. The processor computes a log of the likelihood ratio using the forward and backward state metrics and the branch metrics for a selected state. This is achieved by first computing a max function as an approximation of the measure of the likelihood that a particular sequence of data was transmitted by the encoder. By performing forward and backward Viterbi decoding with dual maxima computations at each node within a window moved over the trellis, the inventive decoder provides the performance benefits associated with a LOG-MAP decoder while avoiding the excessive memory requirements of same. In particular, neither Viterbi et al. nor any of the other prior arts of record teach nor fairly suggest to recursively calculate backward calculation unit state metrics from a block of symbols in a predetermined direction; storing at a first storage area reference vectors corresponding to a selected group of the calculated state metric vectors; and re-calculating in the predetermined direction starting from a stored reference vector of the stored reference vectors at least some of

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the state metric vectors and storing at a second storage area the at least some re-calculated state metric vectors. Therefore, claim 1 is allowable over the prior arts of record.

Independent claims 23 and 43 include similar limitations as those listed in claim 1 and therefore are allowable as well.

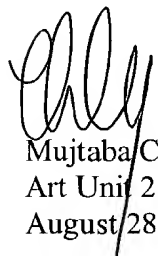
Dependent claims 4-9, 11, 15-19, 21-22, 24, 26-27, 29-31, 33 and 44-49 depend from independent claims 1, 23 and 43 and inherently include the limitations therein and therefore are allowable as well.

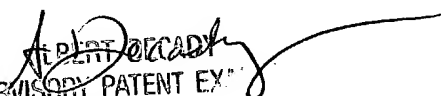
As a note of reference, claims 2-3, 10, 12-14, 20, 25, 28, 32 and 34-42 have been cancelled in the response submitted June 07, 2004.

Any inquiries concerning this communication should be directed to the examiner, Mujtaba Chaudry who may be reached at 703-305-7755. The examiner may normally be reached Mon – Thur 7:30 am to 4:30 pm and every other Fri 8:00 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, please contact the examiner's supervisor, Albert DeCady at 703-305-9595. The fax phone number for the organization where this application is assigned is 703-746-7239.

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist at 703-305-3900.

  
Mujtaba Chaudry  
Art Unit 2133  
August 28, 2004

  
ALBERT DECADY  
SUPERVISOR, PATENT EXAMINER  
TECHNOLOGY CENTER